

REMARKS

Claims 1, 2, 4, 5, and 9 are pending in this application, of which claim 1 is independent. In this Amendment, claim 1 has been amended to correct an error, i.e., replace the word "hydrogen" with --nitrogen--. Support for this correction can be found in, for example, claim 1 in the September 19, 2008 Amendment.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4, 5 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over De Poorter (U.S. Patent No. 5,578,863) in view of Onomura et al. (U.S. Publication No. 2002/0039374, hereinafter "Onomura") and T. Chino et al., "High Reliable InGaAsP Buried Heterostructure Laser Diode Fabricated by Cl2/N2-RIBE and MOVPE," 10th Intern. Conf. on Indium Phosphide and Related Materials, pps 709-712, 1998 (hereinafter "Chino"). This rejection is respectfully traversed.

Applicants submit that the Examiner did not provide any reason to justify a combination of De Poorter, Onomura, and Chino in rejecting claim 1 which reads:

1. (Currently Amended) A semiconductor laser device, comprising:

a semiconductor laser element arranged inside an airtight-sealed package, the semiconductor laser element having an active region formed of a gallium nitride-based crystal,

wherein a rated output power of the semiconductor laser device is 30 mW or more, and an atmospheric gas inside the package is a mixture gas containing oxygen and nitrogen, with an oxygen content of more than 20%, and the semiconductor laser device has a MTF of 3,000 hours or more at 70°C.

The Office Action asserts that De Poorter discloses a semiconductor laser device 10 including a semiconductor laser element 3 inside an airtight sealed package 20 where the atmospheric gas inside the package is a mixture of oxygen and nitrogen with an oxygen content

of *approximately* 20%. The Examiner contends that *approximately* 20% can be interpreted as more than 20%.

The Office Action acknowledges that De Poorter does not disclose a semiconductor laser device having an active region formed of a gallium nitride based crystal **and** that the atmospheric gas inside the package is a mixture of oxygen and nitrogen with an oxygen content of more than 20%. The Office Action acknowledges that De Poorter does not disclose the newly added limitation of a laser device having a mean time to failure (MTTF) of 3,000 hours or more at 70°C. The Office Action relies on Onomura in attempt to cure the admitted deficiencies of De Poorter.

The Office Action asserts that Onomura discloses that the output of the semiconductor laser device is 30 mW or more. The Examiner contends that it would have been obvious to one having ordinary skill in the art at the time the invention was made to find an optimal range (greater than 20%) for the concentration of oxygen inside a package, since it is known that when the oxygen concentration is approximately 20% inside the package, dried air divested of other impurities can be used, as taught by De Poorter. The Examiner relies on the general rule regarding ranges that is, “it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

The Examiner also concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the laser apparatus as taught by De Poorter by mounting the InGaN device on the laser package in order to emit optical radiation at a lower wavelength.

The Examiner cites Chino as teaching a semiconductor laser device with MTTF of 3,000 hours or more at 70°C. The Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the laser device of Chino in the invention of De Poorter since it was known in the art that a laser with a high MTTF is desired.

Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F. 3d 977, 988 (Fed. Cir. 2006) cited with approval in *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). Applicants submit that the Examiner did not provide proper reasons to substitute an InGaAsP/InP laser diode for the InGaN quantum well laser of Onomura.

Chino describes InGaAsP/InP laser diodes, not a semiconductor laser element having an active region formed of a *gallium nitride-based crystal*. It is well known by persons skilled in the art that GaN-based crystals operate in the short and blue wavelength bands, emitting radiation having a wavelength of between 0.4 – 0.5 µm. InGaAsP/InP laser diodes of Chino are *completely different* from the claimed gallium nitride-based crystal in both structure and output.

The AlGaAs- and AlGaInP- based crystals of De Poorter are replaced with the InGaN quantum well laser of Onomura (first modification) to produce a gallium nitride-based crystal having an output of 30 mW or more (second modification). The second modification of the first modification based on Onomura is required to arrive at the claimed subject matter. Applicants emphasize that this results in a strong indication of a hindsight reconstruction of the claimed subject matter based on the use of the Applicants' disclosure as a template. De Poorter's crystals are further modified with Chino's selection of an InGaAsP/InP laser diode having MTTF of 2×10^5 hours at 70°C (third modification), even though De Poorter and Chino do not suggest using a

GaN-based crystal arranged inside an airtight-sealed package having an atmospheric gas inside the package that is a mixture of oxygen and nitrogen with an oxygen content of more than 20%, as required by claim 1. It is noted that the modified device (third modification) does not necessarily have a rated output power of 30 mW or more because Chino describes a laser diode without degradation after 5,000 hours of operation at 70°C under 10 mW conditions.

Therefore, a person skilled in the art would not be motivated to modify De Poorter's device based on the teachings of Onomura, and then, modify De Poorter's modified device based on the teachings of Chino.

Based upon the foregoing, Applicants submit that the Examiner has not established a *prima facie* basis to deny patentability to the claimed invention for lack of the requisite reasons to justify the combination of the references. Applicants, therefore, submit that the imposed rejection of claims 1, 2, 4, 5, and 9 under 35 U.S.C. §103 for obviousness predicated upon De Poorter in view of Onomura and Chino is not factually or legally viable and, hence, respectfully solicit withdrawal thereof.

Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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